



Research Article

EFFECT OF PLANT SPACING AND FYM ON THE GROWTH, YIELD AND DISEASES OF ALOE VERA

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Abstract: *Aloe vera* is one of the most important succulent plants known for its elemental and medicinal properties. It is grown large quantities in many parts of the country, including Uttar Pradesh, Chhattisgarh, Madhya Pradesh, Gujarat, and Rajasthan. To boost the *Aloe vera* production, experiment was conducted from 2019-20 to 2021-22 to assess the optimum spacing and different doses of organic manures on growth, yield, and diseases of *Aloe vera*. The planting at 60 X 60cm with 20 t FYM ha⁻¹ yielded significantly highest no of suckers (12.37plant⁻¹), number of leaves 16 plant⁻¹ and leaf yield 214.86t ha⁻¹.

Keywords: FYM, Plant spacing, Leaf spot, Soft rot disease

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Introduction

Aloe vera is an important perennial drought resistant succulent plant belongs to Aloeaceae family. Aloe is derived from the Arabic word Alloeh, which means shining better stuff, whereas vera in Latin means truth. Two thousand years ago Greek scientists thought aloe as a result of the universal treatment. It is one of the most important contemplative plants in India, and is known for its elemental and medicinal properties. It is grown in large quantities in many parts of the country, including Uttar Pradesh, Chhattisgarh, Madhya Pradesh, Gujarat, and Rajasthan. The fat-soluble vitamins C and E found in aloe gel are antioxidants. Thiamine, niacin, ovolavin (riboflavin), and vitamin complex are all essential nutrients. They contain most common polysaccharides are known as glucomannans [beta-(1,4)-Acetylated mannan]. Rumoured succulent plants are used for treatment of respiratory illness, ulceration, and polygenic disorder. Aloe is well-known for assisting digestion, blood circulation, and urinary organ, liver, and gall bladder function with at least three medicinal fatty acids, which aids in the smooth functioning of the belly, small intestines, and colonies. In the cosmetics business, succulent is used to produce bath soap, shampoo, hair wash, tooth paste, and body lotions [1]. Aloe is susceptible to fungi-caused foliar diseases such as leaf spot, tip rot, base rot, and leaf rot. In spite of its varied the area under cultivation of this species in India is not increasing. The major constraint may be due to the lack of high yielding variety, production, and protection technologies for cultivation of *Aloe vera*. Present study attempt has been made to evaluate different plant spacing and FYM levels for better growth and yield of *Aloe vera* [2-4].

Materials and Methods

The experiment was carried out at the Farm of Medicinal and Aromatic plants, Acharya Narendra Dev University of Agriculture and Technology, Kumarganj, Ayodhya, Uttar Pradesh, India during 2019-20, 2020-21 and 2021-22 to assess the optimum spacing and Farm Yard Manures (FYM) on growth, yield and diseases of *Aloe vera*. Field experiment was conducted in sandy loam soil, with plot size 1.8 X 1.8 m adopting the treatments: S₁ -60 X 30cm, S₂ -60 X 45cm, S₃ -60 X 60cm (Plant Spacing), M₀-0t FYM ha⁻¹, M₁ -5 t FYM ha⁻¹, M₂-10 t FYM ha⁻¹, M₃ - 15 t FYM ha⁻¹ and M₄-20 t FYM ha⁻¹ (FYM levels) in Factorial Randomized Block Design along with three replications. Experiment was laid down during 2nd week of July every year [5-7].

Results and Discussions

Pooled analysis of data [Table-1] revealed that plant spacing and FYM levels significantly influenced the growth and yield of *Aloe vera*. The number of suckers plant⁻¹ was found maximum in plant spacing 60 X 60cm with 20 t FYM ha⁻¹ (T15) followed by 60 X 45cm with 20 t FYM ha⁻¹ (T10) and 60 X 60cm with 15 t FYM ha⁻¹ (T14). The findings are similar with the results reported by Patke *et al* (2018) [8]. The highest number of leaves (16.0) was recorded in T15 and lowest in T1 (6.50 leaves plant⁻¹). High dose of FYM and plant spacing were significantly increased the leave width and leave length, it is might due to high dose of FYM was helped to cell multiplication and elongation without hampering the nutrient uptake [9]. Application of 20 t FYM and 60 X 60cm plant spacing have yielded significantly higher leaf weight (4.15 kh plant⁻¹ and 214.86t ha⁻¹) as compared to other treatments. Saha *et al* (2005) [10], Picham (1987) [11] and Patke *et al* (2018) were reported that higher amount of organic manures effective for increasing leaf weight per plants.

The pooled mean data of 2019-20 to 2021-22 revealed that plant spacing and FYM levels were significantly affect the percent disease severity of leaf spot and soft rot. Minimum percent disease severity (leaf spot 9.06 and Soft rot 5.00) was recorded in plant spacing 60 X 60cm with 20 t FYM ha⁻¹ and maximum in plant spacing 60 X 30cm with 0t FYM ha⁻¹ (leaf spot 19.50PDI and soft rot12.13PDI). The FYM improves the overall soil condition to support the better establishment of plant which in turn impart better resistance to ward the soft rot disease. The organic treatment FYM + VAM + *Trichoderma* were found most superior treatments than all other treatments for suppressing soft rot of ginger [12]. Organic manures especially farmyard manures could raise the concentrations of many nutrients and enhance soil nutritional value for uptake of balance nutrients by plants. Graham *et al* (2000) [13] organic acid such as citric, malic, oxalic acid and phenol have form Fe complexes and released when organic matters decompose. Annih *et al* (2020) [14] found least mean disease severity of white spot disease in Fluted pumpkin in the application of piggery manures as compared with application of poultry manures.

Application of research: Plant spacing 60 X 60cm with 20 t FYM ha⁻¹ yielded more than 20 percent fresh leaves that can boost the commercial production of *Aloe vera*.

Effect of Plant Spacing and FYM on The Growth, Yield and Diseases of Aloe vera

Table-1 Effect of plant spacing and FYM levels on growth, yield, and diseases of Aloe vera from 2019-20 to 2021-22

Treatment	Pooled mean (2019-20 to 2021-22)							
	No. of suckers plant ⁻¹	No. of leaves plant ⁻¹	Leaf length (cm)	Leaf width (cm)	Leaf yield (kg/plant)	Leaf yield (t ha ⁻¹)	Leaf spot PDS	Soft rot PDS
T ₁ (S ₁ M ₀)	4.60	6.50	39.43	3.88	1.72	86.66	19.50 (26.16)	12.13 (20.34)
T ₂ (S ₁ M ₁)	6.46	8.46	42.40	4.63	2.22	112.87	15.41 (23.05)	8.03 (16.36)
T ₃ (S ₁ M ₂)	7.73	10.46	45.56	5.08	2.65	132.73	14.23 (22.10)	7.46 (15.77)
T ₄ (S ₁ M ₃)	8.60	11.33	47.96	5.52	3.22	172.56	12.70 (20.79)	6.13 (13.96)
T ₅ (S ₁ M ₄)	10.70	13.40	48.45	5.87	3.33	174.36	12.16 (20.36)	5.76 (13.75)
T ₆ (S ₂ M ₀)	5.66	7.40	41.30	4.18	1.96	96.83	17.33 (24.55)	10.60 (18.93)
T ₇ (S ₂ M ₁)	7.23	9.90	46.28	4.90	2.45	126.10	15.03 (22.76)	7.56 (15.87)
T ₈ (S ₂ M ₂)	8.20	11.10	49.25	5.47	2.87	144.68	13.26 (21.27)	6.46 (14.61)
T ₉ (S ₂ M ₃)	10.13	12.90	54.13	6.13	3.67	183.52	11.46 (19.69)	5.33 (13.32)
T ₁₀ (S ₂ M ₄)	11.26	14.86	54.80	6.62	3.77	189.83	10.80 (19.06)	5.26 (13.06)
T ₁₁ (S ₃ M ₀)	6.00	7.90	44.11	4.48	2.04	103.95	16.80 (24.13)	8.13 (16.57)
T ₁₂ (S ₃ M ₁)	8.30	10.73	47.73	5.01	2.72	137.00	13.50 (21.46)	6.80 (15.33)
T ₁₃ (S ₃ M ₂)	9.16	12.20	51.13	5.67	3.18	158.10	13.26 (21.27)	6.40 (14.52)
T ₁₄ (S ₃ M ₃)	10.86	13.86	54.98	6.38	3.92	204.36	9.66 (17.99)	5.20 (12.77)
T ₁₅ (S ₃ M ₄)	12.73	16.00	57.10	6.70	4.15	214.86	9.06 (17.35)	5.00 (12.75)
SE(m)	0.200	0.185	0.240	0.067	0.065	2.147	1.51	1.47
C.D. at 5 %	0.583	0.538	0.699	0.196	0.190	6.251	4.38	4.25
C.V.	4.073	2.870	0.861	2.17	3.85	2.503	12.20	16.73

Research Category: Medicinal and Aromatic Plant

Abbreviations: FYM-Farm yard manures

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Study area / Sample Collection: College of Horticulture and Forestry, Kumarganj, Ayodhya, 224229, India

Cultivar / Variety / Breed name: Aloe vera - IC-310596

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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